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EXAMINER

HOFFBERG, ROBERT JOSEPH

ART UNIT PAPER NUMBER

2835

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/734,715

Applicant(s)

SANDERS ET AL.

Examiner

Robert J. Hoffberg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/12/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/12/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

Claim Objections

1. Claim 5 is objected to because of the following informalities: "air flow device" should be "air flow control device." Appropriate correction is required.
2. Claim 18 is objected to because of the following informalities: Claim 18 is dependent on itself. Appropriate correction is required.
3. Claim 14 objected to because of the following informalities: the language of "a power connector housing" is inconsistent language with that of claim 10 of "circuit board power connector". The suggested language change for claim 14 is "the power connector". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Language that suggests or makes optional (i. e. "configured with an opening (claim 1)" or "configured to attach (claim 10)" but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation. See MPEP § 2106 [R-2](II)(C)
6. Claims 11 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See

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MPEP § 2172.01. The omitted structural cooperative relationships are: "the printed circuit board" has not been positively set forth earlier in the claims; it is not clear how it is connected to remaining structure.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claim 1-4, 6 and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Aritani (US 2001/003685).

With respect to Claim 1, Aritani teaches the claimed connector, comprising: conductors (Fig. 4, #23); and a housing (Fig. 6, #40) containing the conductors configured with an opening on at least one side (Fig. 5, #27) other than the front connecting face for promoting air flow (Para. 0022, lines 4-5) across the conductors in the housing.

With respect to Claim 2, Aritani further teaches the fins (Fig. 6 #26) coupled to the conductors and extending out of the housing opening.

With respect to Claim 3, Aritani further teaches the openings (Fig. 5, #27) on opposite sides (Para. 0022, line 2) of the housing for passing air through a first one of the openings, over the conductors, and out a second one of the openings.

With respect to Claim 4, Aritani further teaches an air flow control device (the side walls of Fig. 5, #27 left side) configured to direct air into the housing opening.

With respect to Claim 6, Aritani further teaches an air flow control device (the side walls of Fig. 5, #27 right side) configured to direct air out of the air flow control device.

With respect to Claim 17, Aritani teaches an air flow control device, comprising: a unit for containing a circuit board power connector (Fig. 6, #11); an air intake vent (Fig. 5, #27 on left hand side of #11) for directing air into the unit; and an air outtake vent (Fig. 5, #27 on right hand side of #11) for directing air out of the unit.

With respect to Claim 18, Aritani teaches an air flow control device according to claim 17 (corrected from 18 for purposes of this examination) including openings on opposite sides (Fig. 6, opening #27 extending the opposite ends) of the power connector (Fig. 6, #11).

With respect to Claim 19, Aritani teaches an air flow control device according to claim 18 including heat sink fins (Fig. 6, #26) thermally coupled to conductors (Fig. 5, #25) in the power connector (Fig. 6, #11) and extending out of the openings.

9. Claim 10 is rejected under 35 U.S.C. 102(e) as being anticipated by Yasufuku et al. (US 6,796,831).

With respect to Claim 10, Yasufuku et al. teaches a heat removal system, comprising: a device (Fig. 12, #54) configured to attach over a circuit board (Fig. 12, #2) power connector (Fig. 1, #94 and #95 for powering #92) and including an output vent (Fig. 12, opening for air flow #48) for directing heat away from the power connector.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aritani (US 2001/0003685) as applied to claim 4 above, in view of Konstad (US 6,452,797).

With respect to Claim 5, Aritani teaches the air flow control device of claim 4. Aritani does not teach an air intake vent configured to direct air from underneath a circuit board up through circuit board vias and into the housing opening. Konstad teaches an air intake vent (Fig. 4, #26a) configured to direct air from underneath a circuit board (Fig. 4, #21) up through circuit board via (Fig. 4, opening in #26) and into the housing opening (Fig. 2, #30 over #26). While Konstad fails to disclose a plurality of holes in the printed circuit board, it does have an opening for air flow through the printed circuit board. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Aritani with that of Konstad to provide an intake vent and printed wiring board vias to direct air flow over

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the connector and to have multiple smaller opening to provide strength to printed circuit board.

12. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aritani (US 2001/0003685) as applied to claim 4 above, in view of Yasufuku et al. (US 6,796,831).

With respect to Claim 7, Aritani teaches the air flow control device of claim 4. Aritani does not teach a shroud covering the connector. Yasufuku et al. teaches a shroud (Fig. 12, #54) covering the connector (Fig. 12, #101). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Aritani with that of Yasufuku to direct air flow to cooling the connector.

With respect to Claim 8, Yasufuku further teaches an exhaust vent (Fig. 12, #542) configured to vent air out of the shroud. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Aritani with that of Yasufuku to have an opening to allow air flow to exit the shroud.

13. Claim 9 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Aritani (US 2001/0003685) as applied to claim 4 above, in view of Eberle et al. (US 6,027,535).

With respect to Claim 9, Aritani teaches the air flow control device of claim 4, but did not disclose vias connected to the power plane of the printed wiring board. Eberle et al. teaches a printed circuit board (Fig. 2, #8) with vias (Fig. 2, #32 and #34). Aritani

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and Eberle et al. also to disclose a power plane (inherently, since the printed circuit carries electrical components (Col. 1, line 7) which need to be powered). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the air flow control device of Aritani with that of Eberle et al. in order to provide a printed wiring board with vias as taught by Eberle et al., so as to enhance the cooling efficiency. It would have been also obvious to position (i. e. connect) said vias at any conductive path on said printed wiring board, including the power plane as claimed, in order to optimize the cooling air path, since mere rearranging parts of the invention involves only routine skill in the art. In re Japikse, 86 PSPQ 70.

14. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasufuku et al. (US 6,796,831) as applied to claim 10 above, in view of Konstad (US 6,452,797)

With respect to claim 11, Yasufuku et al. teaches a heat removal system according to claim 10. Yasufuku et al. does not teach an air intake vent and printed circuit board vias. Konstad teaches an air intake vent (Fig. 4, #26a) located on an underside (see Fig. 4) of the printed circuit board (Fig. 4, #21) for directing air up through a hole (void, Col. 3, line 30) in the printed circuit board and into the device (Fig. 2, #30). While Konstad fails to disclose a plurality of holes in the printed circuit board, it does show an air intake vent. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Yasufuku et al. with that of Konstad to provide an intake vent and printed wiring board

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vias to direct air flow to the connector and to have multiple smaller opening to provide strength to printed circuit board.

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasufuku et al. (US 6,796,831) as applied to claim 11 above, in view of Kuchta et al. (US 6,014,319)

With respect to claim 13, Yasufuku et al. teaches a heat removal system according to claim 11. Yasufuku et al. does not teach the holes are electrically coupled to a power plane on the printed circuit board. Kuchta et al. teaches the holes (Fig. 8, #810) are electrically coupled to a power plane (Col. 10, line 46) on the printed circuit board (Fig. 4A, #221). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Yasufuku et al. with that of Kuchta et al. to permit the passage of cooling air to pass over the power plane, in order to enhance cooling efficiency.

16. Claim 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasufuku et al. (US 6,796,831) as applied to claim 10 above, in view of Aritani (US 2001/0003685).

With respect to claim 14, Yasufuku et al. teaches a heat removal system according to claim 10. Yasufuku et al. does not teach a power connector housing with openings with a device directing air flow into a first one of the openings, over conductors in the connector, out a second one of the openings, and out the output vent. Aritani teaches a heat removal system including openings (Fig. 5, #27) in a power connector housing (Fig. 6, # 40), the device directing air flow into a first one of the openings (Fig.

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5, #27 side), over conductors (Fig. 5, #25) in the connector, out a second one (Fig. 5, #27 one of the middle conductor plates) of the openings, and out the output vent (Fig. 5, #27 right side). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Yasufuku et al. with that of Aritani for the purpose of creating an air flow path to cool any device including a connector.

With respect claim 15, Yasufuku et al. as modified by Aritani teaches the heat removal system of claim 14. Yasufuku et al. do not teach fins on the conductors extending out of the housing openings. Aritani further teaches the fins (Fig. 6, #26) on the conductors (Fig. 5, #25) extending out of the housing openings (Fig. 5, #27). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Yasufuku et al. with further that of Aritani for the purpose of increasing the surface for additional cooling capacity.

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasufuku et al. (US 6,796,831) as applied to claim 10 above, in view of Butterbaugh et al. (US 5,630,469).

With respect to Claim 16, Yasufuku et al. teaches a heat removal system according to claim 10, with the exception of a fan located next to the air exhaust for sucking air out of the output vent. Butterbaugh et al teaches a fan (Fig. 2, #30) located next to the air exhaust (Fig. 2, #44) for sucking air (Col. 4, lines 57-58) out of the output vent. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Yasufuku et al. with that of

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Butterbaugh et al. for the purpose that air flow for cooling can be achieved by either expelling or sucking the air over the electrical device.

18. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aritani (US 2001/0003685) as applied to claim 18 above, in view of Le et al. (US 5,680,295).

With respect to Claim 20, Aritani teaches an air flow control device according to claim 18. Aritani does not teach the vias located inside the unit and coupled to the circuit board. Le et al. teaches the circuit board vias (Fig. 5, #56) located inside the unit (Fig. 1, #20) and coupled to a circuit board power plane (Fig. 5, #50). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Aritani with that of Le et al. for to allow for airflow through the circuit board to provide for additional cooling.

Allowable Subject Matter

Claim 12 would be allowable if rewritten in independent form to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Claim 12 is allowable over prior art of record because the prior art does not teach or suggest a hinge that couples the device with the air intake vent.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Xie et al. (US 5,513,070), Gold (US 6,175,493) and Saito (US 5,936,839) for vias in printed wiring board. Johnson et al. (US 5,860,291), Lanclos (US 6,144,556), Martinez (US 6,219,242) and Noolandi et al. (US 6,454,260) for using an air flow for cooling. Loya (US 5,478,221) for a printed wiring board mounted fan. Ishimine

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et al. for a cooling area is proportionate to the fin surface area. Cannon et al. (US 6,198,629), Impellizzeri (US 6,213,866) and Yu et al. (6,239,971) for a fan creating an air flow.

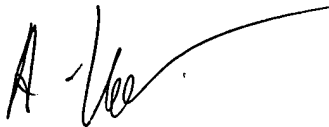
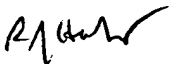
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert J. Hoffberg whose telephone number is (571) 272-2761. The examiner can normally be reached on 8:30 AM - 4:30 PM Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RJH



**ANATOLY VORTMAN
PRIMARY EXAMINER**